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(11) EP 0 889 468 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
05.12.2001 Bulletin 2001/49

(51) Int Cl.7: G11B 11/10, G11B 7/125,
G11B 7/007, G11B 7/00

(43) Date of publication A2:
07.01.1999 Bulletin 1999/01

(21) Application number: 98112208.8

(22) Date of filing: 01.07.1998

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: 02.07.1997 JP 17665197
23.10.1997 JP 29083897
24.06.1998 JP 17740298

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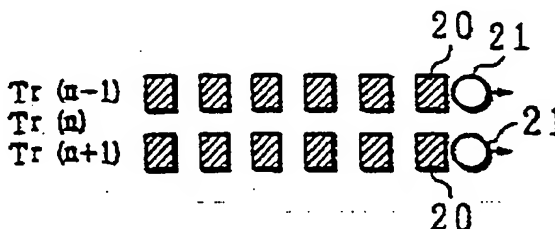
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(54) Recording condition control method, recording condition control device, and optical recording medium for optical recording apparatus

(57) A recording condition control method for an optical recording apparatus includes: a first step of varying a light quantity of a light beam or a strength of an external magnetic field so that a plurality of predetermined recording conditions are set; a second step of recording a first test pattern on a first track on an optical recording medium; a third step of recording a second test pattern on a second track adjacent to the first track; a fourth step of reading the first test pattern on the first track so as to detect a signal quantity; a fifth step of storing the recording conditions and the amplitudes by relating them with

each other; a sixth step of searching the signal quantities stored for one approximating most to a predetermined value; and a seventh step of selecting the signal quantity searched out through the sixth step as the optimal recording condition. By this method, the width of the record marks is optimally controlled, while crosstalk occurring between tracks upon signal reproduction and crosserase (erasure of end portions of record marks due to effusion of record from an adjacent track) upon signal recording are minimized. As a result, it is possible to realize high-densification of tracks.

FIG. 3 (a)



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FIG. 3 (b)

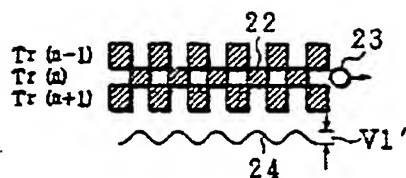


FIG. 3 (c)

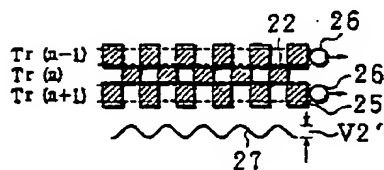


FIG. 3 (d)

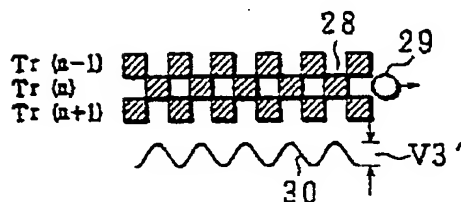


FIG. 3 (e)

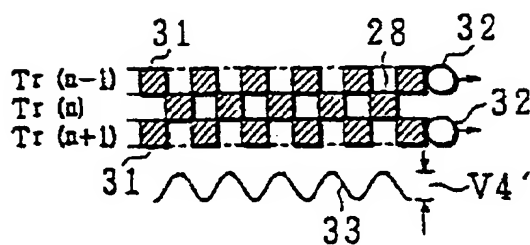


FIG. 3 (f)

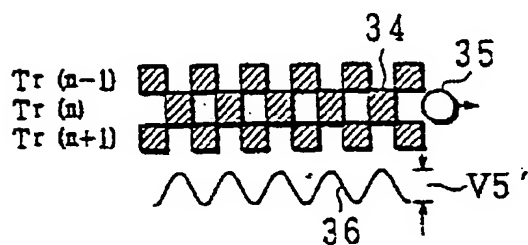
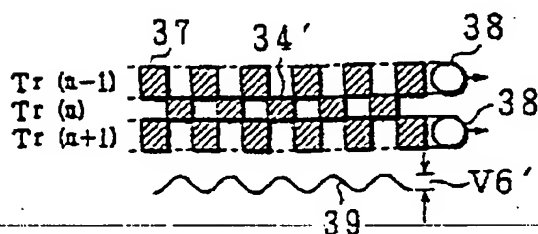


FIG. 3 (g)





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EUROPEAN SEARCH REPORT

Application Number
EP 98 11 2308

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication where applicable of relevant passages	Relevant class	Classification of the application (IPC Class)
X	EP 0 393 001 A (IBM) 17 October 1990 (1990-10-17) * column 10, line 39 - line 49; figure 3 * column 12, line 32 - column 13, line 35	1.2, 4.5, 22, 24-25	G11B11/10 G11B7/125 G11B7/007 G11B7/00
A	EP 0 725 397 A (CANON KK) 7 August 1996 (1996-08-07) * the whole document *	1-22	
A	US 5 483 513 A (FUJII HIROSHI) 9 January 1996 (1996-01-09) * the whole document *	1, 22	
A	US 5 029 185 A (KENJO HIDEYUKI) 2 July 1991 (1991-07-02) * the whole document *	6	
P.A.	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 10, 31 August 1998 (1998-08-31) & JP 10 134354 A (HITACHI MAXELL LTD), 22 May 1998 (1998-05-22) * abstract *	1, 22	TECHNICAL FIELDS SEARCHED: G11B
D.A.	US 5 617 400 A (FUJII HIROSHI) 1 April 1997 (1997-04-01) * the whole document *	16, 20, 21, 36, 41-43	
A	US 5 410 527 A (ASHINUMA TAKAAKI) 12 April 1995 (1995-04-25) * the whole document *	1, 22	

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20 June 2001

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- 97. other cited document of the invention
- 98. other cited document of the invention
- 99. other cited document of the invention
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European Patent
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Application Number

EP 98 11 2208

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1 - 43

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LACK OF UNITY OF INVENTION
SHEET B

Application Number

EP 98.11 2208

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-43

A recording condition control method and associated device for an optical recording apparatus determining an optimal recording condition by amplitude detection of two recorded test patterns in adjacent tracks.

2. Claims: 44-46

An optical recording medium with a test pattern record region used for optimally controlling recording condition which is sectioned by reference marks used for generating an external clock.

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 98 11 2208

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20-06-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0393001 A	17-10-1990	US 5070495 A	03-12-1991
		DE 69016246 D	09-03-1995
		DE 69016246 T	29-06-1995
		JP 2292726 A	04-12-1990
EP 0725397 A	07-08-1996	JP 8203080 A	09-08-1996
		JP 9035357 A	07-02-1997
		JP 9035358 A	07-02-1997
		DE 69604209 D	21-10-1999
		DE 69604209 T	23-03-2000
		US 5815477 A	29-09-1998
US 5483513 A	09-01-1996	JP 7065377 A	10-03-1995
US 5029155 A	02-07-1991	JP 1232545 A	18-09-1989
JP 10134354 A	22-05-1998	NONE	
US 5617400 A	01-04-1997	JP 8063817 A	08-03-1996
US 5410527 A	25-04-1995	JP 61260438 A	18-11-1986
		JP 61260439 A	18-11-1986
		JP 2066091 C	24-06-1996
		JP 7101511 B	01-11-1995
		JP 61294649 A	25-12-1986

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